Course out line

Chapter 1: Matter and Measurement

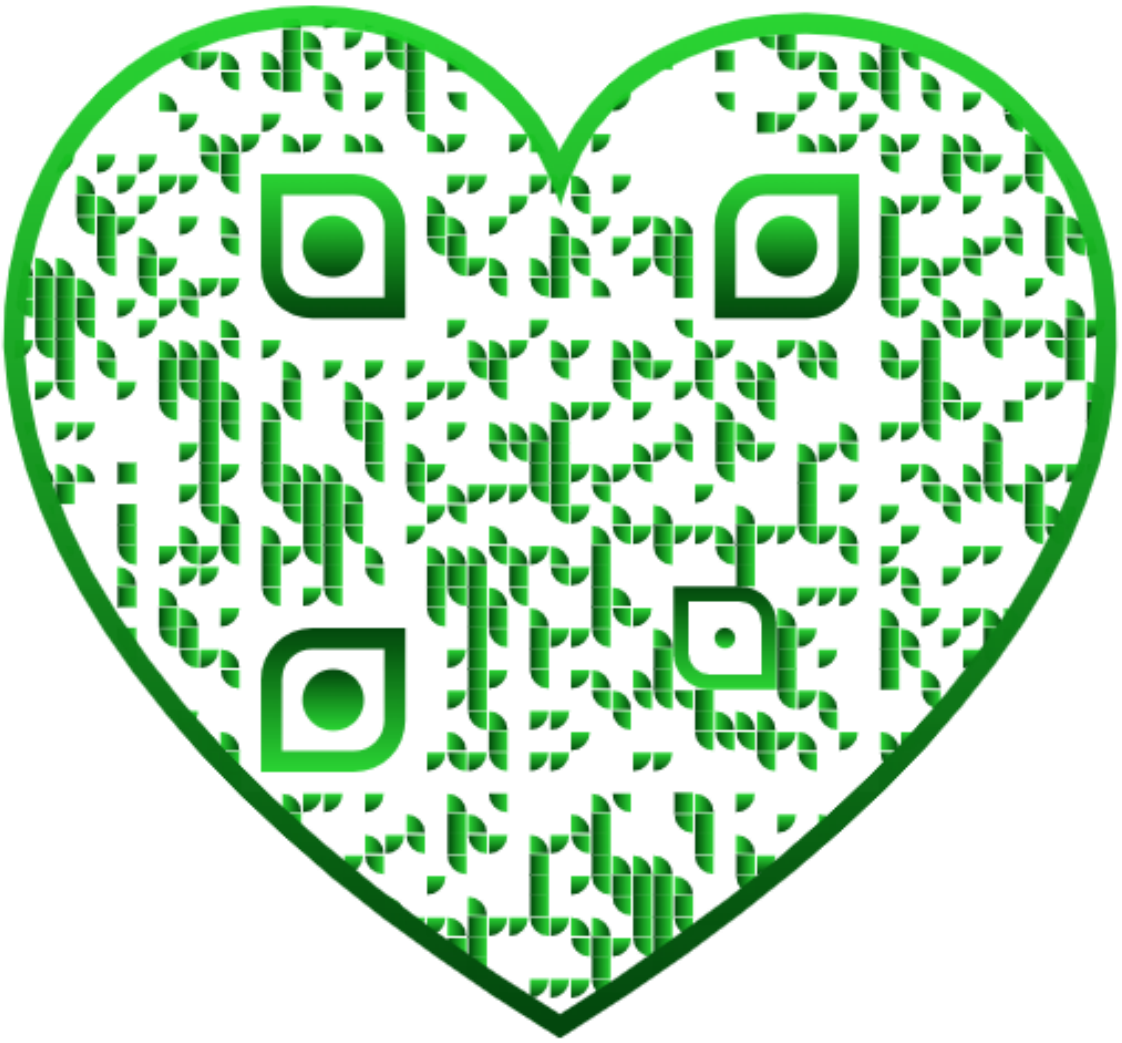
1.1. The study of chemistry
1.2. Classifications of matter
1.3. Properties of matter
1.4. Units of measurement
1.5. Uncertainty in measurement
1.6. Dimensional analyses

Chapter 2: Atoms, Molecules, and Ions

2.1.The atomic theory of matter
2.2.The discovery of atomic structure
2.3.The modern view of atomic structure
2.4. Atomic weights
2.5.The periodic table
2.6. Molecules and molecular compounds
2.7.Ions and Ionic Compounds
2.8. Naming Inorganic Compounds
2.9. Some simple Organic Compounds

Chapter 3: Stoichiometry

3.1 Chemical equations
3.2 Some simple patterns of chemical reactivity
3.3 Formula weights
3.4 Avogadro's number and the mole
3.5 Empirical formulas from analyses
3.6 Quantitative Information from balanced equations
3.7 Limiting Reactants



Chapter Four: Reactions in Aqueous Solution

4.1 General Properties of Aqueous Solutions
4.2 Precipitation Reactions
4.3 Acids, Bases, and Neutralization Reactions
4.4 Oxidation-reduction Reactions
4.5 Concentrations of Solutions
4.6 Solution Stoichiometry and Chemical Analysis

Chapter five: Thermochemistry

5.1 The nature of energy
5.2 The first law of thermodynamics
5.3 Enthalpy
5.4 Enthalpies of reaction
5.5 Calorimetry
5.6 Hess's law
5.7 Enthalpies of Formation
5.8 Foods and Fuels

Chapter 6: Electronic Structure of Atoms

6.1 The wave nature of light
6.2 Quantized energy and photons
6.3 Line spectra and the bohr model
6.4 The wave behavior of matter
6.5 Quantum mechanics and atomic orbitals
6.6 Representations of orbitals
6.7 Many-electron atoms
6.8 Electron configurations
6.9 Electron configurations and the periodic table

Chapter 7: Periodic Properties of the Elements

7.1 Development of the periodic table
7.2 Effective nuclear charge
7.3 Sizes of atoms and ions
7.4 Ionization energy
7.5 Electron affinities
7.6 Metals, nonmetals, and metalloids
7.7 Trends for group 1a and group 2a metals
7.8 Trends for selected nonmetals

Chapter 8: Concepts of Chemical Bonding

8.1 Lewis symbols and the octet rule
8.2 Ionic bonding
8.3 Covalent bonding
8.4 Bond polarity and Electronegativity
8.5 Drawing lewis structures
8.6 Resonance structures
8.7 Exceptions to the octet rule
8.8 Strengths of covalent bonds

Chapter 9: Molecular Geometries and Bonding Theories

9.1 Molecular shapes
9.2 The VSEPR Model
9.3 Molecular shape and Molecular polarity
9.4 Covalent bonding and Orbital overlap
9.5 Hybrid Orbitals
9.6 Multiple bonds
9.7 Molecular Orbitals
9.8 Period 2 Diatomic Molecules

Chapter 10: Gases

10.1 Characteristics of Gases

10.2 Pressure

10.3 The gas laws

10.4 The IDEAL-GAS Equation

10.5 Further applications of the IDEAL-GAS Equation

10.6 Gas mixtures and Partial Pressures

10.7 The kinetic-molecular theory of gases

10.8 Molecular effusion and diffusion

10.9 Real gases: Deviations from ideal behavior

Reference Book: **Chemistry, The central science, 12th Edition** (Theodore L. Brown, H. Eugene LEMay, Jr., Bruce E. Bursten, Catherine J. Murphy, Patrick M. Woodward: **2012**)